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(19) (CA) **CANADIAN PATENT** (12)

(54) TV Program Timer Apparatus and Method

(72) Hoshi, Makoto;  
Sekimoto, Satoshi;  
Osato, Mamoru,  
Japan

(73) Granted to Sony Corporation  
Japan

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# ABSTRACT

A TV program VTR timer apparatus and method incorporates a storage device for storing a plurality of preset times at which TV program signals may be recorded, a manually operable input for entering such times, and a display control device for displaying such times, and the preset duration of recording, on the screen of a TV set associated with the VTR. The screen displays operator instruction messages to facilitate error-free programing and operation of the timer.

## TV PROGRAM TIMER APPARATUS AND METHOD

BACKGROUND OF THE INVENTIONField of the Invention:

The present invention relates to a TV Program timer apparatus for performing scheduled recording of TV program.

Description of the Prior Art:

Conventional VTR timers are programmed while users observe a digital display, and have the following drawbacks:

(1) Since the operating procedures are complicated, the user cannot set the timer merely after a reading of the operating instructions thereof.

(2) ON-time and OFF-time are preset by using a number of buttons or switches, frequently resulting in erroneous presetting.

(3) The user cannot check whether or not the timer is properly set and whether it functions properly as preset.

(4) Since the digital display is used, it is difficult for the user to check the preset time durations. In particular, a preset time duration may overlay another preset time duration, which is an erroneous condition.

In order to eliminate these drawbacks, an analog clock display timer has been proposed. However, a simple analog timer cannot serve as a multiprogram timer which is used to preset a plurality of events (e.g., TV programs) for the following few days.

SUMMARY OF THE INVENTION

The present invention has been made in consideration of the drawbacks of conventional apparatus described above, and



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has for its object to provide a TV program timer apparatus  
wherein

timer programing can be easily performed, the scheduled contents can be checked at once, and the erroneous programing can be eliminated.

In order to achieve the above objects of the present invention, there is provided a TV program timer apparatus employing a CRT display, comprising:

a system controller,

clock means connected to said system controller for generating current time signals,

manually operable input means connected to said system controller for generating program data, and

display control means connected to said system controller for generating display signals to be supplied to a CRT, wherein said display signals are representative of a time table and message from said system controller to an user.

#### BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a perspective view of a TV/VTR apparatus to which a TV program timer apparatus according to an embodiment is applied;

Fig. 2 is a plan view of a main part of the TV/VTR shown in Fig. 1;

Fig. 3 is a flow chart for explaining the steps of recording a TV picture;

Fig. 4 is a flow chart for explaining the steps of performing DIFF. CHAN-REC (different channel recording);

Figs. 5A and 5B are a flow chart for explaining the steps of timer programing; and

Fig. 6 is a block diagram of the TV/VTR apparatus having a program timer, as shown in Fig. 1.

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A preferred embodiment of the present invention will be described with reference to the accompanying drawings.

Referring to Figs. 1 and 2, a time table 3 for timer recording (Fig. 2) is displayed on a CRT display panel 2 of a TV receiver 1 (Fig. 1). A message or telop is superimposed at a lower portion 4 of the CRT display panel 2 to display the operating steps of timer programming. For example, as shown in Fig. 2, a message "Set your REC schedule on the time table with referring to next messages." is displayed.

A required number of TV channel buttons 5 are arranged below the CRT display panel 2. A program timer operation console 8 is arranged on a control panel 7 (Fig. 1). As shown in Fig. 2, the program timer operation console 8 comprises time set dials 1, 2 and 3, for respectively presetting "day" and "AM/PM", "ON time" and "REC duration"; a plurality of event switches (four in this embodiment) 9a for respectively presetting the events; and a cancel button 9b. A cover (not shown) is mounted to cover the program timer operation console 8. The user opens the cover from the program timer operation console 8 and enters timer programming data.

A power switch 12 (Fig. 1), a TV button 10 (Fig. 12) and a VTR button 11 (Fig. 12) are arranged on the control panel 7. The TV button 10 is used to select the TV mode, and the VTR button 11 is used to select the VTR mode. Function buttons 13a to 13d are arranged near the TV and VTR buttons 10 and 11 so as to respectively perform "playback", "recording", "different channel recording" and "programming" in the VTR mode. Furthermore, VTR operation buttons 14, a tape cassette insertion port 15, and a digital display unit 16 are arranged on the panel 7, as shown in Fig. 1.

TV picture recording in the TV/VTR apparatus will be described with reference to Fig. 3.

When the user turns on the power switch 12, a message "For VTR mode, press VTR button." is displayed together with time display "1:30" at the lower portion 4 of the CRT display panel 2. If the user presses the TV button 10, the displayed contents then disappear from the CRT display panel 2, and a TV picture appears thereon. Unless the user presses the TV button 10, the message and the time display disappear in 3 seconds.

When the user presses the VTR button 11 instead, a message "Select one of modes: PLAY/REC/DIFF. CHAN-REC/PROGRAMING." appears on the CRT display panel 2. When the user presses the REC mode button 13b and the corresponding LED is turned on, a message "Select TV channel button." is displayed, and at the same time a TV picture appears on the CRT display panel 2. When the user selects a desired one of the TV channel buttons 5, a message "Insert cassette." appears on the CRT display panel 2. When the cassette is inserted and a REC safety tab sensor switch is turned on, a message "Press REC button." appears on the CRT display panel 2. When the user then presses the REC button among the VTR operation buttons 14, a message "Now recording." is displayed at the lower portion 4 of the CRT display panel 2. However, when the REC safety tab sensor switch is not turned on, a message "Change cassette." appears on the CRT display panel 2. When the user ejects the currently mounted cassette and inserts a blank cassette, recording is started. The message "Now recording." disappears in about three seconds.

Different channel recording in the TV/VTR apparatus will be described with reference to the flow chart in Fig. 4.

If the user wishes to record a different program while he watches a TV program on the 3rd channel (channel 3), the message "Select one of modes: PLAY/REC/DIFF. CHAN-

REC/PROGRAMING." appears on the CRT display panel 2 upon depression of the VTR button 11. When the user presses the different channel recording button 13c, the message "Insert cassette." appears on the CRT display panel 2. When the user inserts the cassette and the REC safety tab sensor is turned on, the message "Select TV channel button." appears on the CRT display panel 2. When the user selects the 6th channel, the 6th channel LED is turned on at an intensity lower than that of the 3rd channel LED. When the REC button of the VTR is pressed, the message "Now recording on 6th channel." appears on the CRT display panel 2.

When the REC safety tab is detected as being cut off, the same operation as in the flow chart of Fig. 3 is performed.

Timer programming will be described with reference to the flow chart in Figs. 5A and 5B.

When the user turns on the VTR button 11, the message "Select one of modes: PLAY/REC/DIFF. CHAN-REC/PROGRAMING." appears at the lower portion 4 of the CRT display panel 2. The user then presses the "PROGRAMING" button 13d. A message "Open the cover of program timer operation console." appears at the lower portion 4 of the CRT display panel 2. When the cover of the program timer operation console 8 is opened, the time table is displayed on the CRT display panel 2, as shown in Fig. 2. At the same time, the message "Turn dial 1 for designating day of week and AM/PM." appears on the CRT display panel 2.

Referring to Fig. 2, the user then turns the dial 1 in the program timer operation console 8 to set the dial 1 in a desired day (AM/PM) position. For example, the user turns the dial 1 to set it in the Wednesday position. During this operation, a cursor 3a moves from the Monday (0:00) position to the Wednesday (0:00) position. A message "Turn dial 2 for designating ON-time." appears on the lower portion 4 of the CRT



display panel 2. The user then turns the dial 2 (Fig. 2) to set the ON-time to be 6:00. The cursor 3a moves downward from the 0:00 position and stops at the 6:00 position. A message "Turn dial 3 for designating REC duration." then appears on the lower portion 4 of the CRT display panel 2. The user then sets the dial 3 (Fig. 2) to set the REC duration to be two hours. Another cursor 3a moves from the 6:00 position to the 8:00 position as indicated in the time range between 6:00 and 8:00 on Monday. A message "Select TV channel button." appears at the lower portion 4 of the CRT display panel 2. When the user presses the 6th channel (i.e., channel "6") of the TV channel buttons 5, a numeric value "6" is displayed in an area corresponding to the time range between 6:00 and 8:00. A message "Press event SW-1." appears on the lower 4 of the CRT display panel 2. When the user presses the event SW-1 of the event switches 9a, the time range between 6:00 and 8:00 on Wednesday is highlighted in green. A telop "insert cassette, if programing is over." appears at the lower portion 4 of the CRT display panel 2. The user then inserts a blank cassette in position. When the cassette-IN sensor is turned on, a message "Close console cover." appears on the lower portion 4 of the CRT display panel 2. When the user closes the console cover, the console cover switch is turned off. As a result, a message "Your REC schedule is reserved at 6:00 for 2-HRS on 6th channel." appears on the lower portion 4 of the CRT display panel 2. Thus the schedule data is stored in a RAM. The time table and the scheduled contents disappear in a few seconds. The user can visually check his/her REC schedule and need not be anxious about TV programing.

In the above operation, if the cassette is not inserted when the user presses the event SW-1, a message "You can reserve another REC schedule." appears at the lower portion 4 of the CRT display panel 2. If the user wishes to reserve another REC

schedule, he uses the dial 1, the dial 2, the dial 3 and an event SW-2 of the event switches 9a. In this embodiment, the four event switches 9a are arranged, so that the user can reserve a maximum of four different types of REC schedules.

The TV/VTR apparatus shown in Fig. 1 has a microprocessor for executing processing shown in Figs. 3 to 5. The microprocessor executes the steps shown in Fig. 3 to 5, upon operation at the control panel 7. In particular, the user can perform timer programing while observing the messages appearing on the CRT display panel 2. In this manner, the user can follow the instructions appearing on the CRT display panel. When timer programing is completed, the program contents and ON times are displayed on the CRT display panel. The microcomputer signals the completion of timer programing to a user (operator). In other words, the user can perform timer programing in a conversational manner. If the user operates erroneously despite the messages given by the microcomputer, the microcomputer signals such an erroneous operation to the user. The user can then operate correctly.

Timer programing can be repeated by a number of times corresponding to the number of event switches 9a (four in this embodiment). The weekly time table (Fig. 2) is displayed on the CRT display panel 2, so that the user can reserve TV programs of the following several days. The cursor 3a is moved in accordance with the messages of the flow chart in Fig. 5, and the programming contents such as day, AM/PM, ON-time, REC duration, and channel number can be displayed in the analog form as shown in Fig. 2. When the user presses event SW-1 (to set the first scheduled time) of the event switches 9a, the designated time range is highlighted in green. The user can check timer programming as he writes a note of the schedule in his notebook. In particular, misprogramming which reserves

overlapping time ranges can be prevented. Since the preset time can be digitally displayed at the digital display unit 16, the start point (ON time) and the end point (OFF time) of each bar in the time table 3 displayed on the CRT display panel 2 need not be displayed with great precision since the time schedule can also be checked precisely with the digital display unit 16.

When timer programming is completed, programmed data can be read out as needed, so that the time table and the reserved time ranges (bars) can be displayed as shown in Fig. 2.

A data processing section of the TV/VTR apparatus having the timer programming function shown in Fig. 1 is shown in Fig. 6.

The data processing section has a microprocessor which comprises a CPU 18, a ROM 19 and a RAM 20. The programs which perform the data processing steps as described above are stored in the ROM 19 and the RAM 20. The TV channel buttons 5, the event switches 9a, the TV button 10, the VTR button 11, the power switch 12, the function buttons 13a to 13d, the time set dial 1, the time set dial 2, the time set dial 3, and the VTR operation buttons 14 shown in Figs. 1 and 2 are all coupled to the CPU 18 and the RAM 20 through an interface circuit 21, a buffer 22 and a data bus 23. Address signals for accessing the buttons and switches are generated by the CPU 18 and are supplied to the interface 21 through an address bus 24 and an address decoder 25. The operation data of TV, VTR and the

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timer are fetched in the CPU 18 and are stored in the RAM 20. The ON/OFF operation of the TV channel lamps and other monitor lamps is controlled by the address data which is supplied from the CPU 18 to an interface 26 through the address bus 24 and the address decoder 25.

The messages, the time table 3 and the cursor 3a are displayed in accordance with the contents stored in a character RAM 27 and a graphic RAM 28, each of which has a memory area

corresponding to the TV display panel. The input data associated with timer programing are supplied from the interface 21 to the CPU 18 and the RAM 20. The input data are then processed under the control of the CPU 18 and are stored, such that the character data is stored in a character RAM 27 and the graphic data is stored in a graphic RAM 28. The write address data is supplied from the CPU 18 to the RAMs 27 and 28 through the address bus 24 and a selector 29. However, when the input data are not supplied to the RAMs, address data are supplied from a CRT controller 30 to the RAMs 27 and 28 through the selector 29, so that the contents are continuously read out from the RAMs 27 and 28 to display the stored contents on the CRT display panel.

ASCII coded data read out from the character RAM 27 is supplied to a character ROM 31 and is converted to a character dot pattern. The outputs from the character ROM 31 and the graphic RAM 28 are mixed by an OR gate 32. A 8-bit parallel signal is then supplied from the OR gate 32 to a parallel/serial (P/S) converter 33. The parallel/serial converter 33 receives the parallel data supplied thereto in response to a clock pulse which has a predetermined period and which is generated from a clock generator 34. The parallel/serial converter 33 then converts the parallel data to a serial video signal. The serial video signal is then supplied from the parallel/serial converter 33 to a monitor TV through a mixer/changeover circuit (MIX/CHGOV) 35. As a result, the display state shown in Fig. 2 is obtained.

On the other hand, a TV tuner 37 is set in response to the operation data supplied from one of the TV channel buttons 5 through the data bus 23. The output video signal is supplied from the TV tuner 37 to the mixer/changeover circuit 35 through a demodulator 38. The video output from the demodulator 38 is supplied to a VTR 39. The VTR 39 is connected to the data bus 23 and is controlled in accordance with the operation of the VTR

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operation buttons 14 and the timer output data read out from the CPU 18 and the RAM 20. A reproduction output from the VTR 39 is supplied to the monitor TV through the mixer/changeover circuit 35.

Outputs from the REC safety tab sensor, the cassette-IN sensor, the dew sensor and the tape-end sensor are supplied onto the data bus 23 through an interface 40. At the same time, an interrupt request signal is supplied from an interrupt controller 41 to the CPU 18, so that the individual outputs from the sensors can be processed as needed. The time signal as the reference of timer counting is generated by a clock IC 42 and is supplied onto the data bus 23. The clock set inputs from the time set keys are supplied to the clock IC 42 through the interface 40.

In the embodiment shown in Fig. 1, in order to perform timer programming at the time table 3 displayed on the CRT display pannel 2, the three dials or rotary knobs 1-3 are used to vertically and horizontally move the cursors 3a. However, the cursor shift mechanism is not limited to this arrangement, but may instead employ pushbuttons (key switches), a joystick, or a write (light) pen. The timer preset apparatus of the present invention can be built into a VTR. Alternatively, the timer preset apparatus can be manufactured as an independent unit. In these cases, the time table 3 and the bar graph indicating the reserved time ranges (Fig. 2) can be displayed on a TV receiver connected to the VTR or timer.

According to the present invention, the cursors displayed in the time table on the CRT display panel can be moved by the time set means of the TV program timer apparatus so as to perform timer programming. Furthermore, the reserved time ranges can be displayed in the form of the bar graph in the time table, so that the user can visually check the programming state. In addition to these advantages, the operation can be simplified,

thereby reducing misoperation. Furthermore, since the user need only follow the messages displayed on the CRT display panel, the chance for misoperation is further minimized. The reserved contents are displayed in the form of the bar graph, and timer programing can be simplified. At the same time, the reserved contents are numerically displayed, so that the bar-graph display is combined with the numeric display to provide better readability. As a result, the user can readily confirm timer programing preventing erroneous setting operation.

From the foregoing, it will be apparent to those skilled in the art how to make and use the present invention. Various additions and modifications may be made without departing from the essential features of novelty thereof, which are intended to be defined and secured by the appended claims.

THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSIVE PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:

1. A TV program timer apparatus employing a CRT display, comprising:
  - a system controller,
  - clock means connected to said system controller for generating current time signals,
  - manually operable input means connected to said system controller for generating program data, and
  - display control means connected to said system controller for generating display signals to be supplied to a CRT, wherein said display signals are representative of a time table and message from said system controller to an user.
2. A TV program timer apparatus as claimed in claim 1, wherein said display signals include cursor signals representative of a cursor which is superimposed on said time table for indicating reserved time schedule on said time table.
3. A TV program timer apparatus as claimed in claim 2, wherein said input means includes start time setting means and duration setting means, said display control means being connected to said switches for generating said cursor signals.
4. A TV program timer apparatus as claimed in claim 3, wherein said display signals from said display control means are adopted to control a CRT to display said time table with cursor and communication message below the time table.



5. A method for timing the recording of a TV program, comprising the steps of entering data into a data storage device consisting of the times to start and stop such recording, displaying said data in graphical form on the screen of a CRT as they are being entered, and displaying a message relating to said data on said screen as such data are being entered, to provide instructions for the entry of such data.

6. The method according to claim 5, wherein said graphical form includes a time table and a cursor superimposed thereon for indicating said start and stop times.

7. A TV program timer apparatus for controlling pre-programmed recording of television signals, employing a CRT display, comprising:

a system controller for controlling recording of television signals;

clock means connected to said system controller for continuously generating current time signals;

manually operable input means connected to said system controller for generating program data for a program to be performed in accordance with said predetermined time signals; and

display control means connected to said system controller for generating display signals to be supplied to said CRT display, said display signals being representative of a time table for said program to be performed and a message from said system controller to a user.

8. A TV program timer apparatus as claimed in claim 7, including means for generating cursor signals representative of a cursor and for providing said cursor signals to said CRT display, whereby a cursor is superimposed on said time table for indicating a reserved future time schedule on said time table.

9. A TV program timer apparatus as claimed in claim 8, wherein said input means includes start time setting means and duration setting means, said display control means being connected to said switches for generating said cursor signals.

10. A TV program timer apparatus as claimed in claim 9, wherein said display control means includes means for generating signals corresponding to a communication message, and for supplying said signals to said CRT display, whereby said communication message is displayed on said CRT display below the time table.

11. A method for preprogramming the timing of the recording of a TV program, comprising the steps of entering data into a data storage device, said data consisting of future times to start and stop such recording, displaying said data in graphical form on the screen of a CRT as such data are being entered prior to such recording, and displaying a message of instruction relating to said data on said screen as such data are being entered.

12. The method according to claim 11, including the step of generating a time table for displaying said data on the screen of said CRT, and generating a cursor signal for said

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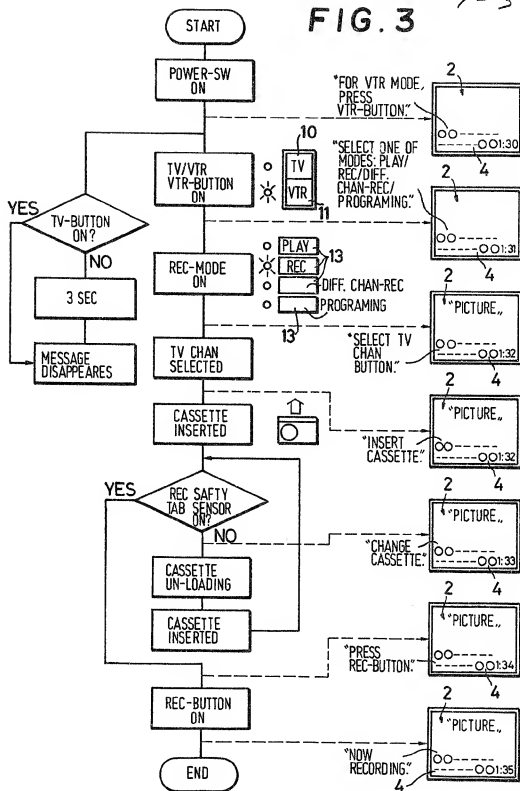
CRT display whereby a cursor appears in said CRT display superimposed on said time table for indicating start and stop times.



A perspective view of a portable electronic device 1, such as a calculator. The device has a rectangular body with a large liquid crystal display 2 on the front. Below the display is a numeric keypad 8 with digits 1 through 9, 0, and a decimal point. To the left of the numeric keypad are several function keys: 10 (a small square key), 12 (a small rectangular key), 11 (a small rectangular key), 13a, 13b, 13c, and 13d (a row of four rectangular keys), and 14 (a row of four rectangular keys). Above the numeric keypad is a small rectangular display 15 showing the numbers 1 through 16. To the right of the numeric keypad is a small rectangular display 16 showing the time 12:30. The device is shown from a perspective view, highlighting its three-dimensional structure.

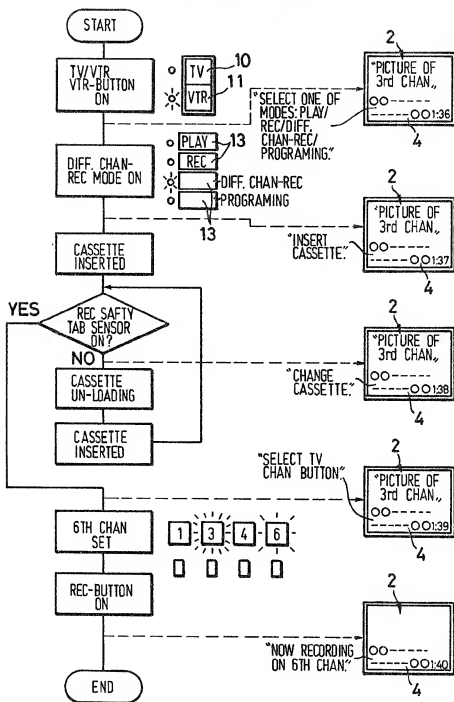


FIG. 3



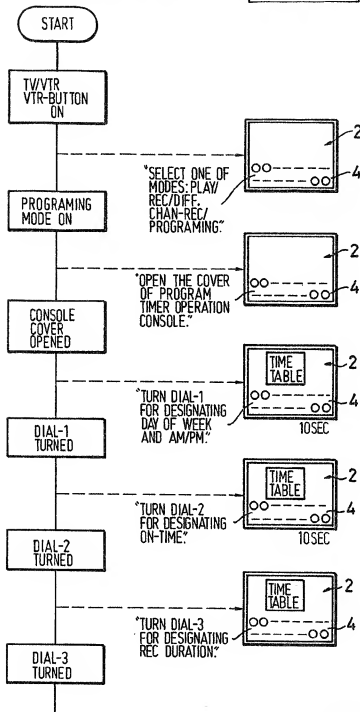
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FIG. 4



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FIG. 5A

FIG. 5A  
FIG. 5B

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FIG. 5B

